

### ABSTRACT

A tunable light source equipped with an optical parametric amplifier (OPA) placed in a cavity for performing an optical parametric oscillation (OPO) driven by a pump beam at a pump frequency selected within a certain range such that the OPO is driven near degeneracy. An adjustment mechanism adjusts the pump frequency within a wavelength tuning range to select a gain spectrum of the OPO and a spectral control mechanism sets a resonant frequency of the cavity within that gain spectrum. Thus, only one of the idler and signal beams within the passband set by the narrowband tuner is supported inside the cavity. Other nonlinear frequency conversion operations can also be performed within the cavity in conjunction with the OPO. The light source can be operated in cw, near-cw and pulsed operation modes as a broadly tunable narrowband source covering a wavelength window of 250 nm.